Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
Restoring Internet Freedom	)	WC Docket No. 17-108

COMMENTS OF TECH KNOWLEDGE

July 17, 2017

EXECUTIVE SUMMARY

Tech Knowledge suggests that the Commission adopt mutually-supporting legal conclusions to ensure the legal sustainability of an order overturning Title II. Under this approach, the Commission's order in this proceeding would conclude that:

- Broadband internet transmissions are not "telecommunications" within the meaning of 47 U.S.C. § 153(50);
- Even if broadband internet transmissions were treated as "telecommunications," broadband internet access service (BIAS) would be an information service within the meaning of 47 U.S.C. § 153(24); and
- Even if BIAS were a "telecommunications service" within the meaning of 47 U.S.C. § 153(53), government-mandated application of Title II to that service would violate the First Amendment.

If a court were to uphold any one of these conclusions, that conclusion standing alone would provide a legal basis for overturning the *Title II Order*.[1]

ANALYSIS

Broadband internet transmissions are not "telecommunications"

Because "telecommunications service" is defined by § 153(53) as "the offering of 'telecommunications,'" a statutory analysis of the Commission's authority to classify broadband internet access service as a "telecommunications service" must begin with the definition of "telecommunications" in 47 U.S.C. § 153(50).[2]

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[1] In the Matter of Protecting and Promoting the Open Internet, WC Docket No. 14-28, Report and Order on Remand, Declaratory Ruling, and Order, FCC 15-24, 30 FCC Rcd. 5601 (2015) (*Title II Order*).

[2] *See Stevens Report* at ¶ 74.

Section 153(50) defines "telecommunications" as "the [1] transmission, [2] between or among points specified by the user, [3] of information of the user's choosing, [4] without change in the form or content of the information as sent and received." The definition of "telecommunications" is thus comprised of four conjunctive elements:

1. It is a "transmission" (not a facility);[3]
2. The transmission must be between or among "points" that are "specified" by the user;
3. The information transmitted must be of the user's choosing; and
4. The information transmitted must not change in form or content.

Until President Obama pressured the Commission to regulate broadband internet access service as if it were plain old telephone service (POTS),[4] the Commission had always maintained that the definition of "telecommunications" is unambiguous.[5] In its 1998 *Stevens Report*, the Commission's most comprehensive review of the 1996 Act's definitions as they apply to internet access, the Commission concluded that, when an internet service provider's (ISP) subscriber accesses the World Wide Web to create a home page "they are, *without question*, utilizing the provider's 'capability for ... storing ... or making available information' to others. The service *cannot accurately be characterized* from this perspective as 'transmission, between or among points specified by the user.'"[6] The Commission noted, for example, that "the proprietor of a Web page does not specify the *points* to which its files will be transmitted, because it does not know *who* will seek to download its files."

Despite the Commission's previous conclusion that it would be "inaccurate" to characterize internet transmissions as "telecommunications," the *Title II Order* concluded that, as of 2015, "[i]t is

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[3] *See Stevens Report* at ¶ 86 (noting that "telecommunications" is defined as a form of "transmission").

[4] *See United States Telecom Ass'n v. Fed. Commc'ns Comm'n*, 855 F.3d 381, 410 (D.C. Cir. 2017) (Brown, C.J., dissenting from the denial of rehearing *en banc*) (*Judge Brown Opinion*).

[5] *See* Federal-State Joint Board on Universal Service, CC Docket No. 96-45, FCC 98-67. Report to Congress, 13 FCC Rcd. 11501, ¶ 76 (1998) (*Stevens Report*).

[6] *Stevens Report* at ¶ 76 (emphasis added).

clear that broadband Internet access service is providing 'telecommunications.'"[7] The *Title II Order* began its analysis by concluding that "the term 'points specified by the user' [the second element of 'telecommunications'] is ambiguous."[8] According to the *Title II Order*, "there is *no question* that users specify the end points of their Internet communications," even though they "often do not know the geographic location of edge providers or other users," because "[c]onsumers would be quite upset if their Internet communications did not make it to their intended recipients or the website addresses they entered into their browser [sic] would take them to unexpected web pages."[9] In other words, the *Title II Order* concluded the fact that consumers can send and receive information they desire using the internet is enough to satisfy the far more specific statutory requirement that they "specify" the "points" of internet transmissions.[10]

The *Title II Order's* finding of ambiguity in the definition of "telecommunications" might seem reasonable in the abstract. But Congress did not adopt the 1996 Act's definitions in the abstract. Congress based its definitions on existing terms of art that were in turn based on concrete network architectures and pre-existing policies that had been illuminated by decades of precedent — precedent the *Title II Order's* cavalier analysis ignored or misconstrued. "Ambiguity is a creature not of definitional possibilities but of statutory context,"[11] as "determined by reference to the language itself, the specific context in which that language is used, and the broader context of the

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[7] *Title II Order* at ¶ 361 (emphasis added).

[8] *Id.* at ¶ 361.

[9] *Id.* (emphasis added).

[10] *Id*. It's difficult to square the *Title II Order's* conclusion that "there is no question that users specify the endpoints of their Internet communications" with its conclusion that "the term 'points specified by the user' is ambiguous."

[11] *Brown v. Gardner*, 513 U.S. 115, 118, 115 S.Ct. 552, 130 L.Ed.2d 462 (1994).

statute as a whole."[12] Courts "do not look at contested phrases in isolation because '[t]he meaning—or ambiguity—of certain words or phrases may only become evident when placed in context.'"[13]

When the phrase "points specified by the user" and the remaining elements of the definition of "telecommunications" are considered in context, "traditional tools of statutory construction" demonstrate that "Congress had an intention on the precise question at issue."[14] Specifically, Congress intended to limit the term "telecommunications" (and hence Title II regulation) to transmissions that are interconnected with the public switched telephone network (PSTN). In other words, it is unambiguous that a transmission is "telecommunications" within the meaning of 47 U.S.C. § 153(50) *only* if the transmission is capable of communicating with *all* circuit switched devices on the PSTN or has the purpose of facilitating the use of the PSTN without altering its fundamental character as a telephone network.[15] This result is compelled by the language and structure of the Communications Act and factual differences between the PSTN and the internet, including their (1) network topologies, (2) functionality, and (3) historical treatment by the Commission and the courts. Taken together, these factors clearly indicate that a plain old telephone call made over the public switched telephone network meets all four elements of the definition of "telecommunications," but broadband internet transmissions do not.

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[12] *Robinson v. Shell Oil Co.*, 519 U.S. 337, 341, 117 S.Ct. 843, 136 L.Ed.2d 808 (1997).

[13] *Valencia v. Lynch*, 811 F.3d 1211, 1214 (9th Cir. 2016) (*quoting Food & Drug Admin. v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 132–33, 120 S. Ct. 1291, 146 L. Ed. 2d 121 (U.S. 2000)).

[14] *INS v. Cardoza–Fonseca*, 480 U.S. 421, 446, 107 S.Ct. 1207, 94 L.Ed.2d 434 (1987).

[15] *See, e.g.*, N. Am. Telecommunications Ass'n Petition for Declaratory Ruling Under Section 64.702 of the Commission's Rules Regarding the Integration of Centrex, Enhanced Servs., & Customer Premises Equip., FCC 85-248, 101 F.C.C.2d 349, ¶¶ 23-28 (1985) (defining "adjunct services" as those that "facilitate use of the basic network without changing the nature of basic telephone service"); Petition for Declaratory Ruling That AT&T's Phone-to-Phone IP Telephony Servs. Are Exempt from Access Charges, Order, FCC 04-97, 19 F.C.C. Rcd. 7457 at ¶ 12 (2004) (noting that "internetworking" conversions are still "telecommunications" if they are interconnected with the PSTN).

Element 1: Transmissions

First, it is unambiguous that the term "telecommunications" applies to "transmissions," not to facilities (irrespective of the ownership thereof). This is made plain by the definition of "telecommunications" itself and affirmed by the definition of "telecommunications services," which applies to the offering of telecommunications "regardless of the facilities used."[16]

After the Commission classified cable modem service as an "information service" in 2002,[17] some advocates began pushing a novel interpretation of Title II regulation. They claim that, for the purpose of determining whether Title II's common carriage provisions apply, the Communications Act defines a "clear separation" between last mile network facilities themselves (including the facilities of wireless and cable systems) and services that use last mile network facilities.[18] They also claim that this alleged separation "has nothing to do with whether or not the network owner is a monopolist."[19]

Neither claim is supported by the text of the definition of "telecommunications" or by the structure of Act. The Communications Act regulates "services," not "facilities" — e.g., the Act regulates "cable service" in Title VI, "television service" in Title III, and "telecommunications service" in Title II. To the extent the Act's definitions of various communications services mention facilities, they generally do not distinguish between the type, ownership, or location of such facilities. As the Supreme Court noted in *Brand X*, "[t]he Act's definition of 'telecommunications service' says noth-

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[16] 47 U.S.C. § 153(53).

[17] *See* Inquiry Concerning High-Speed Access to the Internet Over Cable & Other Facilities, GN Docket No. 00-185, CS Docket No. 02-52, Declaratory Ruling and Notice of Proposed Rulemaking, 17 FCC Rcd. 4798 (2002) (*Cable Modem Order*).

[18] See Candace Clement and S. Derek Turner, *Reclassification Is Not a Dirty Word*, Free Press (Jan. 17, 2014), available at http://www.freepress.net/blog/2014/01/17/reclassification-not-dirty-word.

[19] *Id.*

ing about imposing more stringent regulatory duties on facilities-based information-service providers."[20]

The Commission generally treats common carriers and other communications providers as offering fully integrated services directly to end users. The Commission created a limited *exception* to this general approach in the *Common Carrier Resale Order*, which required *monopoly* common carriers offering private and public switched telephone service to offer their underlying facilities for lease (or "unbundle" them) so that other entities could use those facilities to provide their own service offerings directly to end users.[21] At the same time, the Commission determined that resellers of telecommunications service are fully subject to Title II of the Communications Act even though they do not own the underlying facilities.[22] In short, regulated resale was intended to mitigate the impact of the telephone monopoly on nascent data processing services, not create a new, generally-applicable regulatory boundary between facilities and services.[23]

Second, it is clear that "telecommunications" are a subset of communications transmissions that are subject to regulation by the Commission. For example, the Act defines "cable service" as "the one-way transmission" of video programming and video programming services to subscribers,[24] "radio transmission" as "transmission by radio,"[25] and "wire communication" as "transmission of ...

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[20] *Nat'l Cable & Telecommunications Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 996, 125 S. Ct. 2688, 162 L. Ed. 2d 820 (2005).

[21] *Common Carrier Resale Order* at ¶ 81.

[22] *See* Regulatory Policies Concerning Resale & Shared Use of Common Carrier Servs. & Facilities, Report and Order, FCC 76-641, 60 F.C.C.2d 261 at ¶ 8 (1976) (*Common Carrier Resale Order*); Regulatory Policies Concerning Resale and Shared Use of Common Carrier Domestic Public Switched Network Services, Report and Order, FCC 80-607, 83 F.C.C.2d 167 at ¶ 1 (1980). *See also Title II Order* at ¶ 188 n.458 ("The Commission has consistently determined that resellers of telecommunications services are telecommunications carriers, even if they do not own any facilities.").

[23] The Commission initially imposed a resale obligation on mobile carriers, *see* Cellular Communications Systems, Report and Order, FCC 81-161, 86 F.C.C.2d 469 at ¶ 105 (1981), but lifted that obligation once competition developed. *See* Interconnection & Resale Obligations Pertaining to Commercial Mobile Radio Servs., First Report and Order, FCC 96-263, 11 F.C.C. Rcd. 18455 at ¶ 14 (1996), *aff'd Cellnet Communications, Inc. v. FCC*, 149 F.3d 429, 436 (6th Cir. 1998) (affirming that there is no common carrier obligation to allow resale of services).

[24] 47 U.S.C. § 522(6).

[25] 47 U.S.C. § 153(40).

all kinds by aid of wire, cable, or other like connection between the points of origin and reception of such transmission."[26] To be "telecommunications," a transmission must meet the other three elements of its definition in 47 U.S.C. § 153(50).

Elements 2 & 3: Points specified by the user & information of the user's choosing

These elements alone indicate Congress's intent to distinguish between transmissions on the PSTN (i.e., "telecommunications") and internet transmissions (i.e., "information services") in the 1996 Act's definitions. The ability of a user to control (or not control) the points of a transmission and the information transmitted are clear distinctions between POTS calls on the PSTN and internet transmissions. On the PSTN, a user placing a plain old telephone call specifies the points of the call *merely by dialing a telephone number*, and decides what to say (or not to say) on the call. Conversely, internet transmissions have a "total lack" of any definable points,[27] and often result in multiple 3rd-party transmissions the end user does not choose and about which the end user is often unaware. The following comparison of network topologies and addressing systems for the PSTN and the internet illustrates these distinctions.

Topology of the public switched telephone network

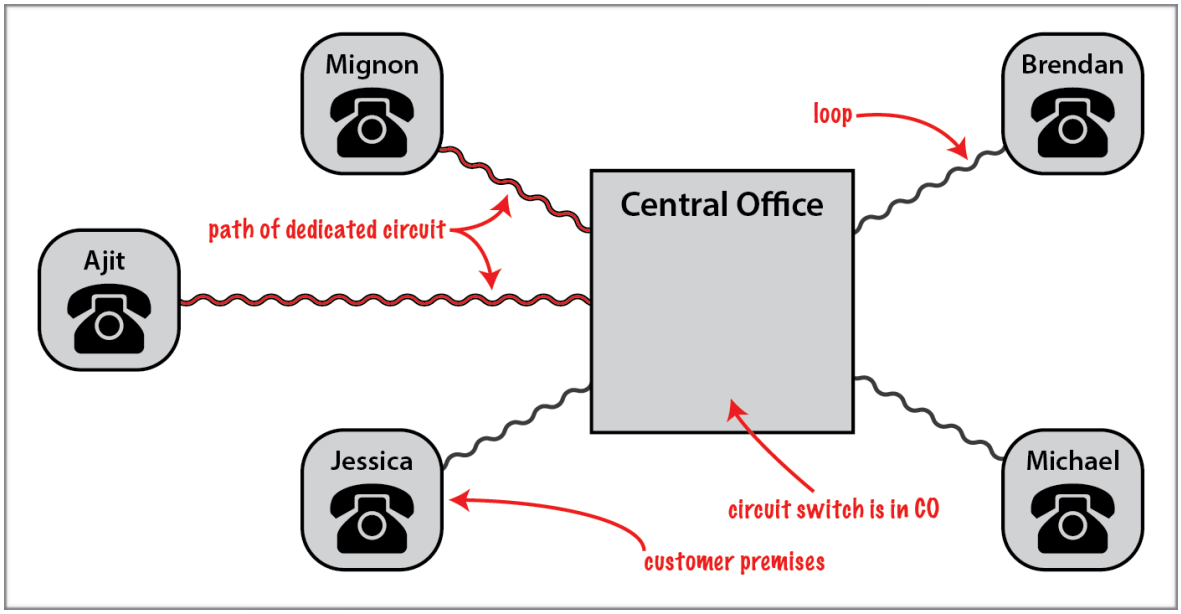
The earliest telephone communications used a full-period circuit in which all telephones were connected to a single telephone line, a system that lacked privacy and was limited in scale (because a call between any two users effectively denied service to all others connected to the same line). Within a few years of the telephone's invention, the Bell System addressed scale and privacy issues through centralized circuit switching. In this topology, each residence and business (or "customer premises") is typically connected by a dedicated, private line (or "loop") to a switchboard (or "switch") located in a facility ("central office" or "CO") near the center of a local network (which

[26] 47 U.S.C. § 153(59).

[27] *See* Vonage Holdings Corp., Memorandum Opinion and Order, FCC 04-267, 19 FCC Rcd. 22404 at ¶ 25 (2004).

minimizes loops lengths). The switch connects one loop to another loop to establish a dedicated circuit for the duration of the call.

Figure 1. Circuit Switched Network



For example, if Ajit called Mignon on the switched network depicted in Figure 1, the switch would connect Ajit's loop to Mignon's loop to set up the call. During the call, the circuit formed by their loops would be dedicated to their conversation only. The switch would disconnect their loops only when Ajit or Mignon hangs up.

Centralized switching works well in relatively small geographic areas, but in areas that require long loop lines, centralized switching is uneconomical. The Bell System's solution was to keep the areas served by central offices relatively small (about three miles in radius) and to interconnect central offices with "trunk" lines. Whereas subscriber loops are typically dedicated access circuits that connect customer premises to the central office, trunks are shared because only a small percentage of loops are typically in use simultaneously. Though trunks are shared, each call still receives a dedicated circuit. When the central office switches a loop to an unused trunk line, it reserves (or

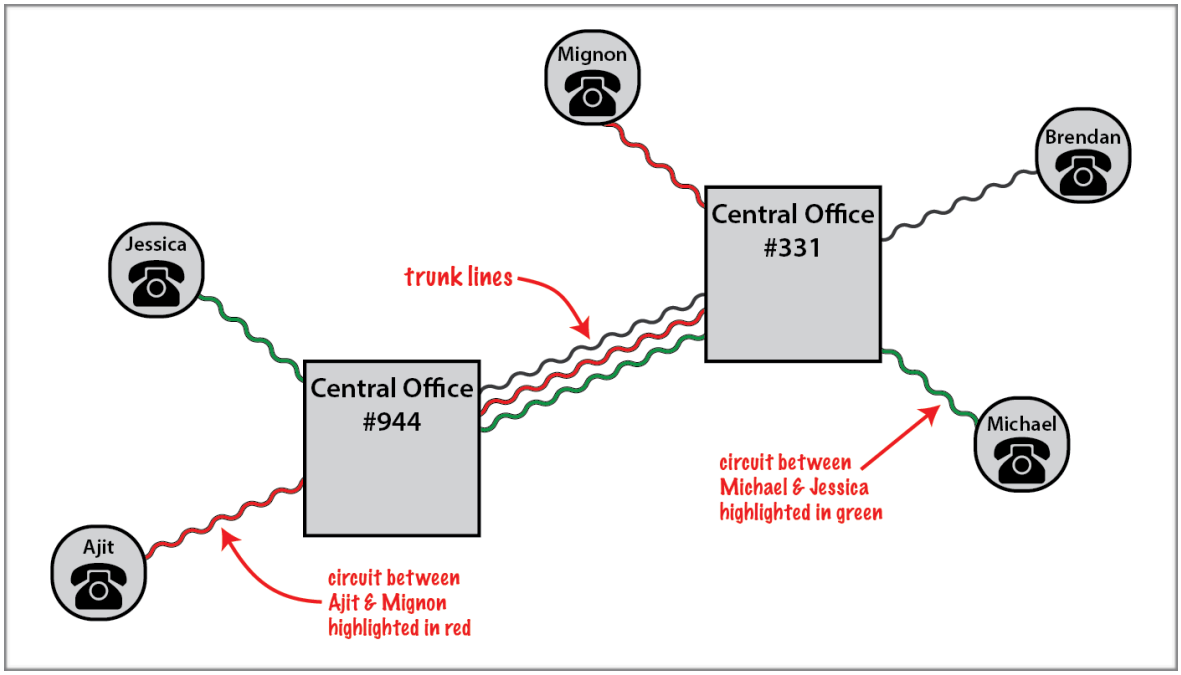
"seizes") the trunk for the duration of the call. When the call is disconnected (because a party hangs up), the trunk is "released" for use in another call.

Communications between central offices are connected by switching the loop of the calling party at the "initiating central office" to a trunk line connecting to the "terminating office," which then switches the trunk to the loop of the party being called.

For example, when Ajit calls Mignon using the network depicted in Figure 2, Central office #944 is the initiating central office, which seizes the trunk line highlighted in red and switches Ajit's loop to it. Central office #331 is the terminating central office that switches Mignon's loop to the trunk highlighted in red to complete the circuit. This circuit will remain dedicated to the call between Ajit and Mignon for its duration.

Similarly, when Michael calls Jessica using the network depicted in Figure 2, central office #331 is the originating central office, Central office #944 is the terminating central office, and the trunk line highlighted in green is dedicated to their call. If the trunk highlighted in green had

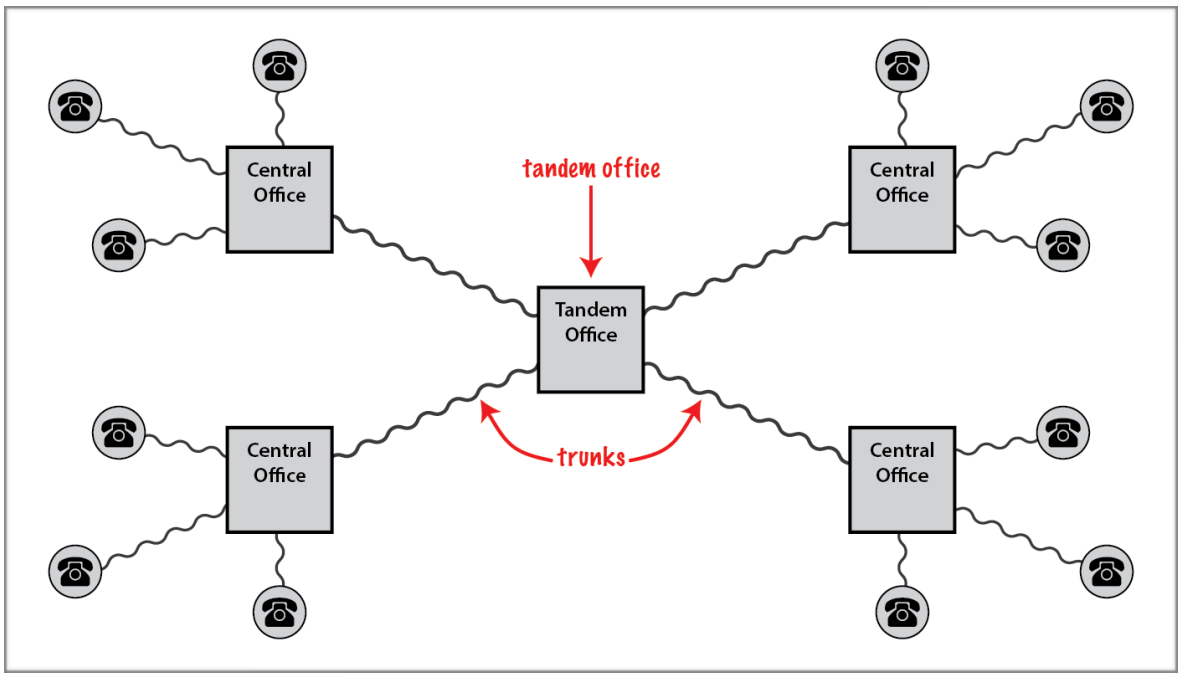
Figure 2. Trunk Lines



already been in use, the switch in central office #331 would have seized another trunk (in this example, the unhighlighted trunk).

In larger cities, multiple central offices are connected by "tandem offices" (or "tandem switches") that only switch (tandem) trunk lines and cannot originate or terminate a call. The use of tandem offices avoids the need to directly interconnect all central offices in a local area, as depicted in Figure 3.

Figure 3. Tandem Office

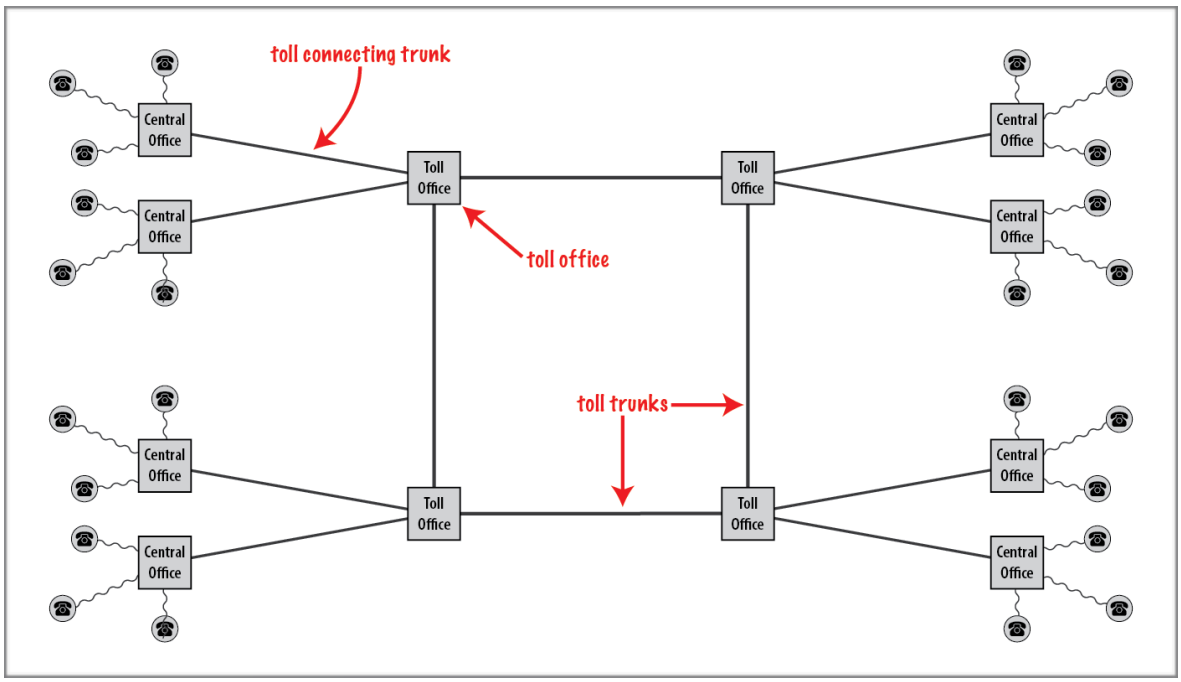


The centralized local switching topology described above is typically used within a city and its immediate area. The network within such an area is known as an "exchange." Calls made within an exchange area are usually included within the basic telephone subscription price (i.e., there is no additional charge to make a local call within the same exchange area).

Calls between exchanges (known as "toll," "long distance," or "interexchange" calls) use the "long distance" network, which is an extension of the "local tandem" network topology used in larger local exchange areas. Exchanges are connected to other cities using long distance (or "toll") trunk

lines. An exchange sends a long distance call through the local "toll office" (or "interexchange office") which handles billing for long distance calls (because long distance calls were traditionally not covered by the basic subscription price). The toll office (which might be merely a specially equipped portion of the switchboard in an exchange with a single central office), then switches the call to the appropriate intercity line, either directly or through an "access tandem." A simple long distance network is depicted in Figure 4.[28]

Figure 4. Long Distance Network



Telephone numbers specify points

Telephone numbers function as the addresses of customer premises (e.g., specific residential telephone loops), individual subscriber telephones (i.e., a different telephone number is assigned to each mobile device),[29] or other telephony endpoints. The basic numbering scheme for the PSTN

[28] The toll trunks are represented by smooth rather than wavy lines to indicate that the trunks are actually bundles of multiple twisted copper pairs.

[29] *See* Interconnection Between Wireline Tel. Carriers & Radio Common Carriers Engaged in the Provision of Domestic Pub. Land Mobile Radio Serv. Under Part 21 of the Commission's Rules, Memorandum Opinion and Order, FCC 77-61, 63 F.C.C.2d 87, 93 (1977) (determining that a telephone number would be assigned to each mobile device).

was developed by the Bell System, which settled on the use of ten digit telephone numbers in 1947.[30] This ten-digit numbering scheme became known as the North American Numbering Plan (NANP), and was administered by AT&T until it divested its operating companies in 1984, at which time the NANP's administration was transferred to another company.[31] The NANP applies in all regions where the international country code is "1".[32]

The format for a 10 digit telephone number is divided into 3 parts represented as NXX-NXX-XXXX, in which "N" represents any digit from 2 through 9 and "X" represents any digit from 0 through 9 (the "N" digits are limited in order to save 0 for calling an operator and 1 for signaling a long distance call).

1. The first three digits are the "Numbering Plan Area" or "NPA" code. Most NPA codes are assigned to a particular exchange area and are thus commonly known as "area codes."[33]
2. The three digits following the area code are known as the "central office" or "office" code and are assigned to a specific central office within an exchange.[34]
3. The final four digits are known as "line" or "station" codes and are assigned to a specific local loop or "station" (e.g., a mobile device such as cellular phone or tablet).

Dialing a telephone number thus specifies the endpoints of a call on the analog PSTN, because a telephone number uniquely identifies (1) a specific exchange area (via the area code), (2) a specific central office (via the office code), and (3) a specific local loop or station (via the line or station

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[30] *See* Admin. of the N. Am. Numbering Plan, Notice of Inquiry, FCC 92-470, 7 FCC Rcd. 6837 at ¶ 4 (1992) (*NANP Notice*).

[31] *See id.* (*citing United States v. Western Electric Co.*, 569 F. Supp. 1057 (D.D.C. 1983)).

[32] The international public telecommunication number plan is defined by recommendation E.164 of the Telecommunications Standardization Sector (ITU-T) of the International Telecommunication Union, a specialized agency of the United Nations.

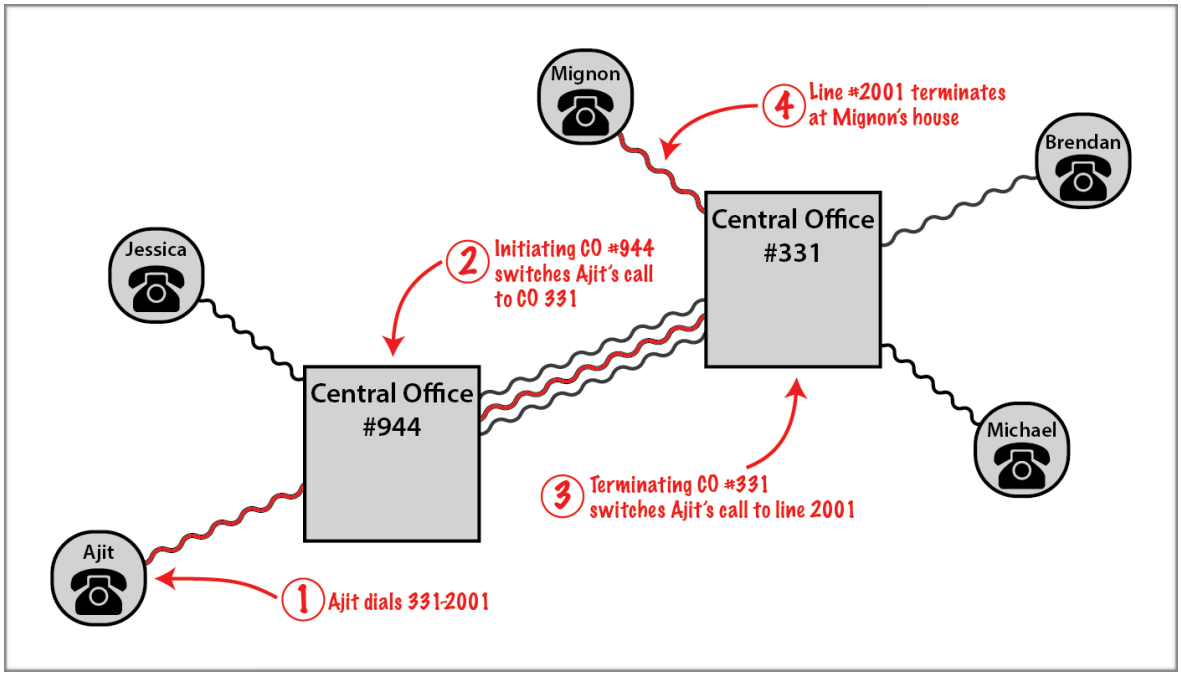
[33] *See NANP Notice* at ¶ 8 (1992). The exceptions are NPA codes with the format N00 (i.e., 200, 300, 400 . . . 900), known as "Service Access Codes," and NPA codes with the format N11 (i.e., 211, 311 . . . 911), known as "Service Area Codes." *Id.* at ¶ 9.

[34] *See id*. at ¶ 10.

code) that is dedicated to a specific customer premises (e.g., a residential address) or a specific device (e.g., a mobile phone).

For example, when Ajit dials the 7 digit number "311-2001" to call Mignon using the local exchange network depicted in Figure 5, the PSTN's signaling system knows that Ajit's call must be routed through the central office that has been assigned the (terminating) office code "311" and that Ajit wants to reach the subscriber of a loop served by that office that has been assigned the line code "2001," which terminates at Mignon's home.

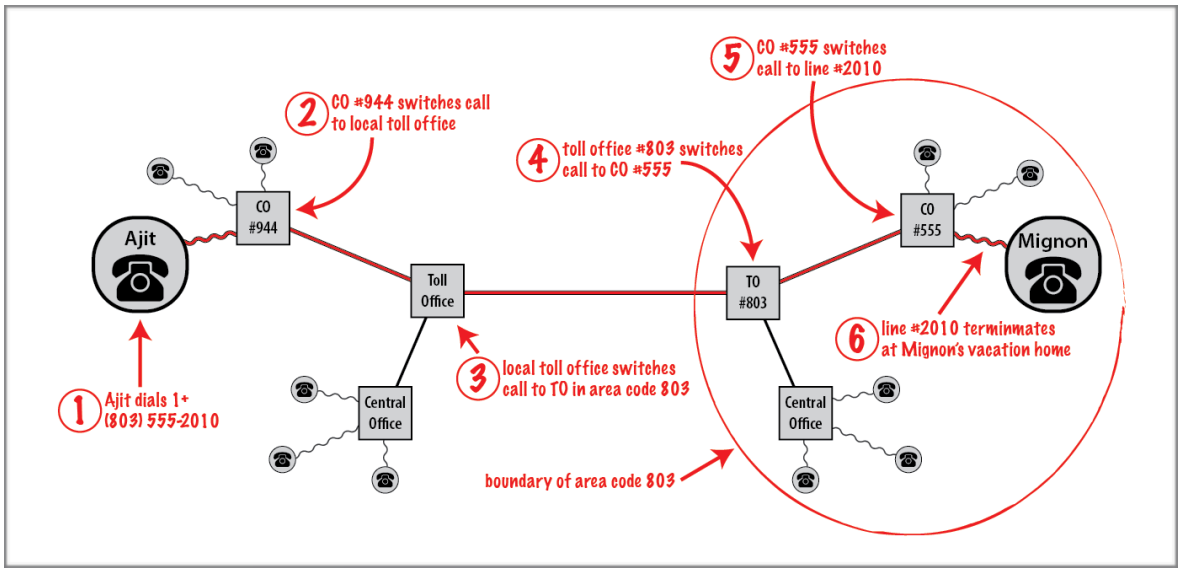
Figure 5. Specifying the Points of a Local Call



Assume Ajit wants to place a long distance call to Mignon's vacation home at telephone number (803) 555-2010. In this example, illustrated in Figure 6, Ajit would first dial a 1 to signal that he intends to make a long distance call. Central office #944 would then switch the call to the toll office in Ajit's local exchange. That toll office would switch the call to the toll office in area code 803, and the toll office in area code 803 would switch the call to central office #555. Central office

#555 would then switch the call to line #2010, the local loop that terminates at Mignon's vacation home.

Figure 6. Specifying the Points of a Long Distance Call



According to the PSTN's fundamental design, a user who places an analog POTS call on the wired portion of the network is specifying the initiating and terminating points of a call, both geographically (because the physical location of the initiating and terminating lines *and* switches are known) and in terms of particular facilities (because there is a one-to-one correspondence between lines (i.e., loops) and line codes and a one-to-one correspondence between central offices and central office codes. A traditional POTS call can be routed to these points using purely electromechanical switching with no digital processing whatsoever.

Adjunct-to-basic services and the telecommunications management exception

Figures 1 through 6 above describe traditional analog (electromechanical) switching on the wired PSTN. Though today's PSTN uses computerized switching and signaling systems to offer enhanced functionality, longstanding Commission precedent indicates that use of computerized switching and signaling capabilities does not fundamentally alter the PSTN's character or the conclusion that the definition of "telecommunications" only applies to transmissions that are intercon-

nected with the PSTN. Indeed, the very existence of computerized switching capabilities, which began to be installed in telephone company central offices in the early 1960s,[35] is what prompted the Commission to establish a "firm boundary"[36] separating regulated "basic" services from unregulated "enhanced services" in *Computer II*.[37]

The Commission later clarified in the *Centrex Order* that the firm boundary it drew in *Computer II* was between PSTN and non-PSTN services, not between computerized services and non-computerized services.[38] The Commission recognized there were services that could be provid-

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[35] *See* N. Am. Telecommunications Ass'n Petition for Declaratory Ruling Under Section 64.702 of the Commission's Rules Regarding the Integration of Centrex, Enhanced Servs., & Customer Premises Equip., 101 F.C.C.2d 349 at ¶ 18 n.16 (1985).

[36] Am. Tel. & Tel. Co. Petition for Waiver of Section 64.702 of the Commission's Rules & Regulations, 88 F.C.C.2d 1, 3 (1981).

[37] *See generally* Regulatory & Policy Problems Presented by the Interdependence of Computer & Commc'n Servs. & Facilities, Notice of Inquiry, 7 F.C.C.2d 11 (1966), *on further notice*, Report and Further Notice of Inquiry, 17 F.C.C.2d 587 (1969), Final Decision and Order, Docket No. 16979, FCC 71-255, 28 F.C.C.2d 267 (Mar. 18, 1971) (*Computer I*), *aff'd in part sub nom.*, *GTE Serv. Corp. v. FCC*, 474 F.2d 724 (2d Cir. 1973), Decision on Remand, Order, FCC 73-342, 40 F.C.C.2d 293 (Apr. 3, 1973); Amendment of Section 64.702 of the Commission's Rules and Regulations (Second Computer Inquiry), Final Decision, Docket No. 20828, FCC 80-189, 77 F.C.C.2d 384 (May 2, 1980) (*Computer II*), *on reconsideration*, Memorandum Opinion and Order, FCC 80-628, 84 F.C.C.2d 50 (Dec. 30, 1980) (*Computer II Reconsideration*) and Memorandum Opinion and Order on Further Reconsideration, FCC 81-481, 88 F.C.C. 2d 512 (Oct. 30, 1981), *aff'd sub nom.*, *Computer and Commc'n. Indus. Ass'n v. FCC*, 693 F.2d 198 (D.C. Cir. 1982); Amendment of Sections 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry), Report and Order, CC Docket No. 85-229, FCC 86-252, 104 F.C.C.2d 958 (June 16, 1986), *on reconsideration*, Memorandum Opinion and Order on Reconsideration, FCC 87-102, 2 FCC Rcd. 3035 (May 22, 1987), Memorandum Opinion and Order on Reconsideration, FCC 88-9, 3 FCC Rcd. 1135 (Feb. 18, 1988) and Memorandum Opinion and Order on Further Reconsideration and Second Further Reconsideration, FCC 89-226, 4 FCC Rcd. 5927 (Aug. 1, 1989), *vacated in part*, *California v. FCC*, 905 F.2d 1217 (9th Cir. 1990); Report and Order, CC Docket No. 85-229, FCC 87-103, 2 FCC Rcd. 3072 (May 22, 1987), *on reconsideration*, Memorandum Opinion and Order on Reconsideration, FCC 88-10, 3 FCC Rcd. 1150 (Feb. 18, 1988), *vacated in part*, *California v. FCC*, 905 F.2d 1217 (9th Cir. 1990); Computer III Remand Proceedings, Report and Order, CC Docket No. 90-368, FCC 90-415, 5 FCC Rcd. 7719 (Dec. 17, 1990), *on reconsideration*, Memorandum Opinion and Order on Reconsideration, FCC 92-14, 7 FCC Rcd. 909 (Jan. 24, 1992); Computer III Remand Proceedings: Bell Operating Co. Safeguards and Tier I Local Exch. Co. Safeguards, Report and Order, CC Docket No. 90-623, FCC 91-381, 6 FCC Rcd. 7571 (Dec. 20, 1991), *vacated in part and remanded*, *California v. FCC*, 39 F.3d 919 (9th Cir. 1994); Computer III Further Remand Proceedings: Bell Operating Co. Provision of Enhanced Servs.; 1998 Biennial Review—Review of Computer III and ONA Safeguards and Requirements, Further Notice of Proposed Rulemaking, Report and Order, CC Docket Nos. 95-20 & 98-10, FCC 98-8, 13 FCC Rcd. 6040 (Jan. 30, 1998), Report and Order, FCC 99-36, 14 FCC Rcd. 4289 (Mar. 10, 1999), on reconsideration, Order, FCC 99-387, 14 FCC Rcd. 21628 (Dec. 17, 1999) (collectively, *Computer Inquiries*).

[38] *See* N. Am. Telecommunications Ass'n Petition for Declaratory Ruling Under Section 64.702 of the Commission's Rules Regarding the Integration of Centrex, Enhanced Servs., & Customer Premises Equip., 101 F.C.C.2d 349 at ¶¶ 17-28 (1985) (*Centrex Order*).

ed by the telephone company that "might indeed fall within possible literal readings of our definition of an enhanced service, but ... explicitly rejected the notion" that Computer II was intended to prohibit carriers from adding new optional features to the basic network that "facilitate use of traditional telephone service."[39] The *Centrex Order* dubbed services that "facilitate use of the basic network without changing the nature of basic telephone service" as "adjunct-to-basic" services,[40] and "held that the enhanced services definition did not encompass adjunct-to-basic services."[41] The Commission similarly exempted "those forms of protocol processing which are necessary for a switched service to be offered" from the enhanced services definition."[42]

Adjunct-to-basic services included most services enabled by the deployment of out-of-band signaling (typically "Signaling System 7" or "SS7") networks beginning in the 1980s, which access remote databases to provide specialized call routing information to switches and enable custom calling and custom local area signaling service (CLASS) features, such as caller ID, automatic callback, automatic recall, call waiting, call forwarding, 3-way calling, and other similar services.[43] The Commission included call re-routing functions that rely on database access in the "adjunct-to-basic" category because "[t]he result of the re-routing is that, if the telephone to which the call is routed is picked up, the customers obtain an open transmission channel between their telephones; in other words, they get ordinary, basic telephone service."[44] The Commission distinguished this type of database access from a "voice mailbox-type service [through which] subscribers obtain the use of a

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[39] *Centrex Order* at ¶¶ 23-24.

[40] *Centrex Order* at ¶ 28.

[41] Implementation of the Non-Accounting Safeguards of Sections 271 & 272 of the Commc'ns Act of 1934, As Amended., 11 F.C.C. Rcd. 21905 at ¶ 107 (1996) (*Non-Accounting Safeguards Order*).

[42] Commc'ns Protocols Under Section 64.702 of the Commission's Rules & Regulations, 95 F.C.C.2d 584, 591 at ¶ 15 (1983).

[43] *See, e.g., Non-Accounting Safeguards Order* at ¶ 107 n.245 (1996) (noting that "[a]djunct-to-basic services include, *inter alia*, speed dialing, call forwarding, computer-provided directory assistance, call monitoring, caller i.d., call tracing, call blocking, call return, repeat dialing, and call tracking, as well as certain Centrex features").

[44] *Centrex Order* at ¶ 27.

storage facility into which messages can be placed for later retrieval," which (like e-mail or web access) does not create a specific "transmission channel ... between caller and the intended destination of the caller's communication."[45] The Commission had previously concluded that "to include voice or data information *storage* services within the ambit of a basic service would be to destroy any meaningful regulatory boundary that otherwise exists and unduly expand the common carrier offering beyond one of providing the appropriate communications pipeline for the transmission of information to services in which communications is merely a factor of production."[46]

Local number portability (LNP) offers another example of call re-routing that is enabled by SS7 networks and is used to facilitate PSTN calls. Though the the first 6 digits of a 10-digit telephone number (the "NPA-NXX") historically identified the address of a specific telephone switch, today the NPA-NXX number often identifies only the switch to which the number was originally assigned, because LNP allows users to keep their 10-digit NANP number when they switch telecommunications service providers. Local number portability is accomplished by assigned a Location Routing Number (or "LNR") to each ported NANP telephone number. For a ported number, the Location Routing Number replaces the NPA-NXX as the address of the serving switch, but the LNR does not change the specified endpoint of the call.

When a call is made to a ported telephone number, the initiating switch launches a query to its LNP call routing database to determine whether the telephone number has been ported. If the number has been ported, the database response provides the switch with the LRN needed to terminate the call. If the number has not been ported, the database response indicates that the call should be routed based on the NANP telephone number. In either case, the call is connected to the sub-

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[45] *Centrex Order* at ¶ 27. The Commission classified voice and data information storage and retrieval services as enhanced services in its *Computer II Reconsideration* order. *See Computer II Reconsideration* at ¶ 12. *See also* Am. Tel. & Tel. Co. Petition for Waiver of Section 64.702 of the Commission's Rules & Regulations, 88 F.C.C.2d 1, 4 (1981) (noting that an 'information retrieval service' "could not be fairly classified as a basic service").

[46] *Computer II Reconsideration* at ¶ 12 (emphasis added).

scriber's specific loop (i.e., current residence) or a subscriber's specific station (i.e., mobile device), and the geographic location of the terminating office is known.

In the *Non-Accounting Safeguards Order*, the Commission held that the previously excepted forms of protocol processing services and the exception for "adjunct-to-basic services" — services that would otherwise fit the definition of enhanced services — were incorporated into the 1996 Act's "telecommunications management exception" to the statutory definition of information services, and "therefore are *treated* as telecommunications services under the 1996 Act."[47]

Users specify points for mobile calls interconnected with the PSTN

Though the exact geographic location of a mobile device might be unknown, the interconnection of mobile devices with the PSTN does not alter its fundamental nature as a "telecommunications" network that establishes dedicated transmission paths between known points. When a POTS user dials a telephone number assigned to a mobile phone, the user still specifies a particular point — the specific mobile phone being called — because the station code (the last 4 digits of the telephone number) corresponds directly to the specific phone at which the call terminates and will establish a dedicated communications path between the caller and the mobile phone.

Mobile carriers that are interconnected with public switched telephone network rely on the NANP and dedicated circuit switching to establish mobile phone calls in the same way as the wired public switched telephone network does to establish plain old telephone calls.[48] In its first order addressing jurisdictional issues related to the interconnection of cellular networks with the PSTN, the FCC explained that the cellular service was designed as a self-contained telephone network whose

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[47] *See Non-Accounting Safeguards Order* at ¶¶ 106-107 (emphasis added). The Commission also concluded, apparently in the alternative, that they *are* "telecommunications," but this conclusion was inconsistent with the statute's plain language and the Commission's overall conclusion that the 1996 Act definitions were intended to codify the Commission's pre-existing definitions of basic and enhanced services.

[48] *See generally* The Need to Promote Competition and Efficient Use of Spectrum for Radio Common Carrier Services, Declaratory Ruling, FCC 87-163, 2 FCC Rcd. 2910 (1987) (addressing jurisdictional issues related to the interconnection of mobile telephone switching offices with the PSTN).

users were interconnected through a central switch (the "mobile telephone switching office" or "MTSO") designed to function as a regular central office switch in the landline telephone network.[49] A mobile network's MTSO could thus be interconnected with the PSTN as easily as any other newly opened central office.[50]

Because each mobile device is assigned a unique 10-digit telephone number, a user who dials a telephone number assigned to a mobile device specifies the endpoint of the call in the same way as call to a landline telephone number — the endpoint of the call is the specific mobile device assigned to the 4-digit station number dialed by the user. Although the geographic location of a mobile telephone may not be known with absolute precision, the precise geographic location of the MTSO and the base transceiver station ("BTS" or "base station," commonly known as a wireless tower) that "terminate" the connection to the mobile telephone are both known. In any event, a PSTN call to a mobile telephone will always attempt to connect to the specific mobile device associated with the 10-digit NANP number dialed by the user. If the network cannot connect to the specified mobile device, the call will not be connected at all. A user who dials a mobile telephone number is thus specifying a known endpoint for termination of the call irrespective of the mobile phone's precise physical location.

For example, assume Ajit uses his landline telephone to call Mignon's mobile telephone number, (803) 747-2015, using the network depicted in Figure 7. After Ajit dials the number, the initiating central office switches the call to the MTSO assigned the NXX number 747. The MTSO switches Ajit's call to the base transceiver station ("BTS" or "base station") that has the strongest connection with Mignon's mobile phone (station number 2015), and the BTS connects the call.

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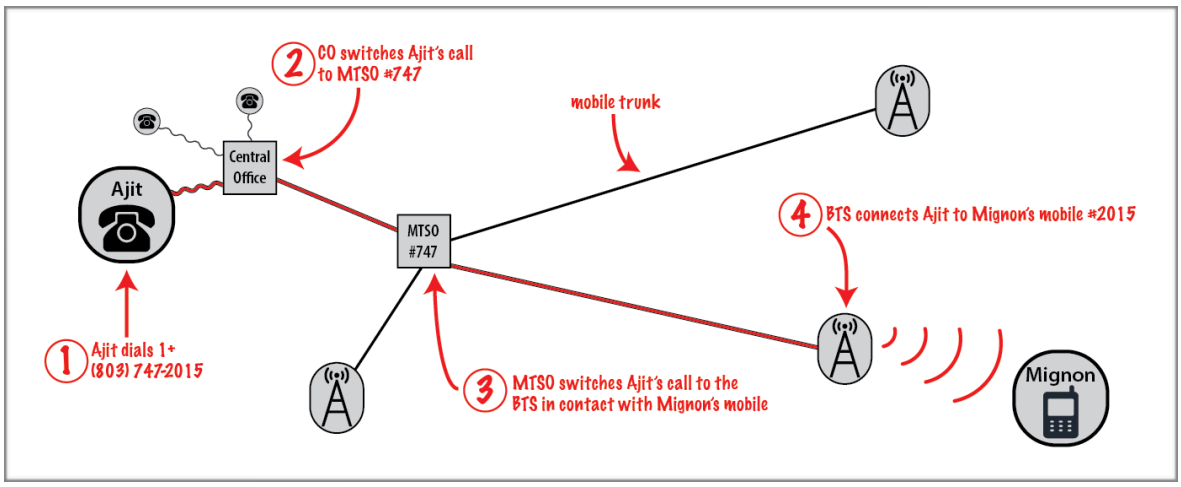
[49] *See id.* at ¶ 31.

[50] *See id.* Alternatively, mobile carriers could connect to the PSTN like a private branch exchange (or "PBX"). *See id.* at n. 16.

Figure 7. Specifying the Points of a Mobile Call



Ajit's call would be completed to Mignon's specific mobile device no matter where the phone is located geographically, so long as it could establish a connection with an MTSO and base station that could terminate the call. In other words, the endpoint of a POTS call made to Mignon's mobile telephone number on the PSTN will *always* be Mignon's mobile telephone.

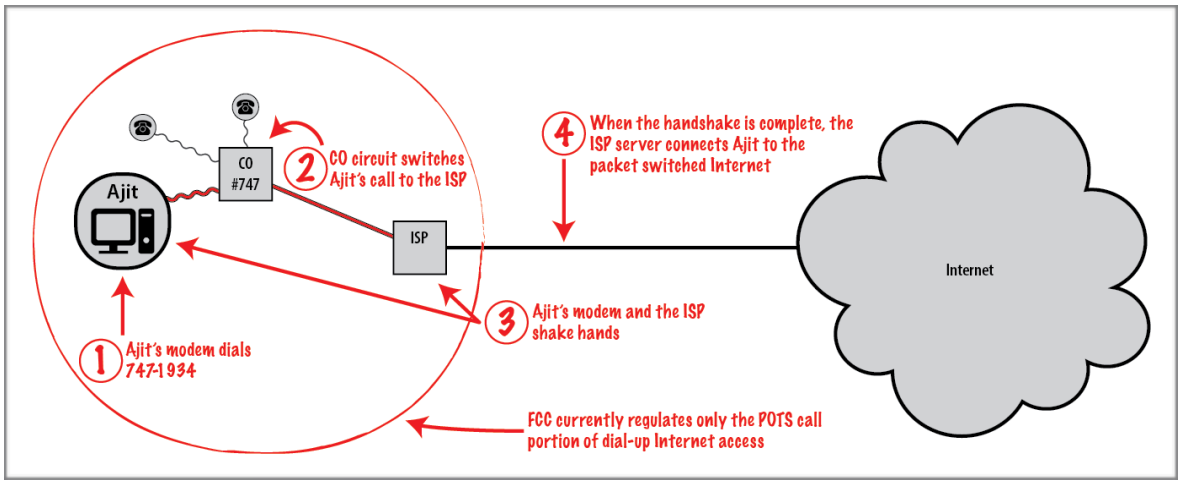
Users specify points when dialing into a dial-up internet connection

A user of dial-up internet service specifies a particular endpoint for the initial dial-up call in the same way as a user makes an ordinary telephone call. To establish an internet connection, dial-up users make an ordinary, analog telephone call by dialing a 7-digit local telephone number (NXX-XXXX) that is assigned to a "toll free" business line that is connected to the ISP's server.[51] Once the call is switched to the ISP's server, the server performs a "handshake protocol" with the user's modem to authenticate the user's access and connect the user to the internet (the handshake is why a dial-up modem produces strange chirping noises when it first tries to connect). A dial-up connection to the internet is only established *after* the telephone call is connected to the ISP's server and the handshake is complete. Only then does the ISP server begin performing the function of converting the circuit-switched voice call data to the packet-switched communications used by internet

[51] Dial-up ISPs traditionally leased this local loop from the incumbent telephone company at a government-regulated flat monthly rate. *See Bell Atl. Tel. Companies v. FCC*, 206 F.3d 1, 4 (D.C. Cir. 2000).

routers.[52] A dial-up internet connection thus originates as a telephone call on the PSTN in order to "access" internet communications networks, as illustrated in Figure 8.

Figure 8. Dial-Up Internet Access



The dial-up internet's reliance on an ordinary telephone call for access to the internet is why all "information services" in the dial-up era were delivered "via telecommunications." The *only* portion of the underlying "transmission" of dial-up internet access that meets the definition of "telecommunications" in 47 U.S.C. § 153(50), however, is the portion of the transmission from the customer's premises to the ISP's switch, because it is the only portion of the transmission for which the user specifies endpoints (by dialing the ISP's local telephone number). It is for this same reason that the dial-up call is the only portion of dial-up internet access the FCC has regulated since *Computer II*, even though the internet backbone shared many of the same long distance facilities that were subject to Title II regulation when they were used to provide telephone interexchange service.[53]

Commission and judicial precedent make this point clear. When the telephone monopoly was dismantled in 1983, the FCC required that "interexchange carriers" (i.e., long distance tele-

[52] Even after the ISP has establish a connection to the internet, the communications between the ISP's switch and the user's dial-up modem transmits information using audible tones like those used to set up an ordinary POTS call (different tones represent different binary digits in a manner similar to the dots and dashes used in Morse code).

[53] *C.f. Stevens Report* at ¶ 15.

phone companies) pay "access charges" to "local exchange carriers" (LECs) to keep basic telephone rates low while ensuring LECs received sufficient revenue to maintain the infrastructure of local telephone exchanges (which had previously been maintained through monopoly rents). The FCC temporarily exempted "enhanced service providers" from paying access charges in order to avoid a "bill shock" to data users.[54] This "ESP exemption" was initially intended to be temporary, because it "forced [telephone subscribers] to bear a disproportionate share of the local [telephone] exchange costs that access charges [were] designed to cover."[55] The FCC subsequently extended the ESP exemption indefinitely – despite its discriminatory impact on telephone subscribers who didn't use data services (which were mostly used by big businesses at that time) – because the market for data services was still emerging. The FCC concluded that, "to the extent the exemption for enhanced service providers may be discriminatory, it remains, for the present, not an unreasonable discrimination."[56]

After the 1996 Act was passed, the FCC converted the ESP exemption into the information service provider or "ISP" exemption, which exempted independent dial-up internet service providers from paying access charges and the per-minute rates applicable to interstate "telecommunications services" (i.e., long distance telephone calls).[57] The FCC treated "over the top" dial-up ISPs as local "end user" customers and permitted them to lease lines from telephone companies at the significantly lower, flat monthly rates applicable to business lines used for local calls.[58] Because dial-up ISPs could pay a flat monthly rate for unlimited data traffic rather than the per-minute charges

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[54] *See* MTS and WATS Market Structure, Memorandum Opinion and Order, FCC 83-356, 97 FCC 2d 682 (1983).

[55] *See* Amendments of Part 69 of the Commission's Rules Relating to Enhanced Service Providers, Order, FCC 88-151, 3 FCC Rcd. 2631 at ¶ 2 (1988).

[56] *Id.* at ¶ 19.

[57] *See* Access Charge Reform, First Report and Order, FCC 97-158, 12 FCC Rcd. 15982 (1997).

[58] See Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 and Inter-Carrier Compensation for ISP-Bound Traffic, Declaratory Ruling and Notice of Proposed Rulemaking, FCC 99-38, 14 FCC Rcd. 3689 at ¶ 4 (1999) (*ISP Preemption Order*), *vacated and remanded by Bell Atlantic Tele. Cos. v. FCC*, 206 F.3d 1 (D.C. Cir. 2000).

that were then applicable to consumers' long distance telephone calls, ISPs offered unlimited dial-up internet access to consumers at flat monthly rates that were artificially low in comparison to the rates charged for long distance telephone service. As a result, consumers who subscribed to telephone services paid "subscriber line charges" and higher per-minute long distance rates to cover costs to local exchange networks that were caused by dial-up ISPs and their subscribers. Even telephone subscribers who were not using internet services were in effect required by law to subsidize dial-up ISPs.

Although treating dial-up internet traffic as "local" meant that ISPs did not have to pay access charges (which apply only to interstate telephone calls), the 1996 Act introduced a new payment type — "reciprocal compensation" — that was designed to apply to the exchange of local calls between different carriers.[59] The states, which have jurisdiction over local calls only, interpreted this provision as requiring that dial-up ISPs pay reciprocal compensation for their share of the costs involved in maintaining local telephone exchanges.

The FCC quickly issued the *ISP Preemption Order* to preempt the states from requiring ISPs to pay reciprocal compensation. It based its preemption on jurisdictional grounds by applying its traditional end-to-end analysis and concluding that dial-up ISP-bound traffic is inherently interstate.[60] The FCC concluded that the internet could not be separated into an "intrastate telecommunications service" (the call from the consumer to the dial-up ISP's local server) and an "interstate information service" (the internet access provided by the ISP's local server), because the definition of "information services in the 1996 Act recognizes the inseparability, for purposes of jurisdictional analysis, of the information service and the underlying telecommunications."[61] The FCC thus required states to treat dial-up ISP traffic as local for pricing purposes and as interstate (i.e., long dis-

[59] *See* 47 U.S.C. § 251(b)(5).

[60] *ISP Preemption Order* at ¶ 12.

[61] *Id.* at ¶ 13.

tance) for jurisdictional purposes. The FCC justified this counterintuitive result by noting the "strong federal interest in ensuring that regulation does nothing to impede the growth of the internet – which has flourished to date under our 'hands off' regulatory approach – or the development of competition."[62]

The D.C. Circuit vacated and remanded the FCC's jurisdictional ruling "for want of reasoned decisionmaking."[63] The court emphasized the critical difference between the circuit-switched PSTN and the internet with respect to endpoints:

> In a conventional "circuit-switched network," the jurisdictional analysis is straightforward: a call is intrastate if, and only if, it originates and terminates in the same state. In a "packet-switched network," the analysis is not so simple, as "[a]n internet communication does not necessarily have a point of 'termination' in the traditional sense." FCC Ruling, 14 FCC Rcd at 3701-02 (¶ 18). In a single session an end user may communicate with multiple destination points, either sequentially or simultaneously.[64]

The court noted that a call to an ISP is not quite long distance, though some internet communications might take place between the ISP and computers that are out-of-state, "because the subsequent communication is not really a continuation, in the conventional sense, of the initial call to the ISP."[65] The Commission's rules indicated that, because the telephone call used to establish the dial-up connection "terminates" at the called party's premises, for calls to dial-up ISPs, the ISP is "clearly the 'called party.'"[66] In other words, the ISP's switch is the "point" specified by a dial-up user to send and receive "telecommunications" transmissions when making a dial-up call. But, once the ISP receives a dial-up call, it "originate[s] further communications [but *not* "telecommunications"]to deliver and retrieve information to and from distant websites."[67]

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[62] *Id.* at ¶ 6.

[63] *Bell Atl. Tel. Cos. v. FCC*, 206 F.3d 1, 3 (D.C. Cir. 2000).

[64] *Id.* at 5.

[65] *Id.*

[66] *Id.* at 5-6.

[67] *Id.* at 6.

After a further remand and mandamus, the Commission determined that ISP-bound traffic is interstate, interexchange traffic, but that it should be afforded different treatment from other such traffic (i.e., exempted from ordinary access charges) pursuant to the Commission's authority under 47 U.S.C. §§ 201 and 251(i).[68] The D.C. Circuit upheld the Commission this time, because dial-up internet traffic is "special" in that it involves "interstate communications that are delivered through local calls," and thus implicates provisions governing local and long distance communications simultaneously.[69] Because the petitioners had not challenged the applicability of the Commission's end-to-end jurisdictional analysis, and petitioners did not dispute that dial-up internet traffic extends from the user to the internet, "or that the [*not* telecommunications] communications, viewed in that light, are interstate," the court concluded it "has no significance for the FCC's § 201 jurisdiction over interstate communications that these telecommunications might be deemed to "terminat[e]" at a LEC for purposes of § 251(b)(5)."[70] The court's careful distinction between interstate internet "communications" on the one hand, and local "telecommunications" on the other, clearly indicates the court did not consider the internet portion of the communications to be "telecommunications."

Broadband internet users do not specify points of transmission

"[I]n marked contrast to traditional circuit-switched telephony" and dial-up internet connections, broadband transmissions "originate on the internet" and do not have specifiable points of termination.[71] With internet transmissions, "'even two packets from the same message may travel over different physical paths through the network . . . which enables users to invoke multiple Internet services simultaneously, and to access information with no knowledge of the physical location of

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[68] *See* Intercarrier Comp. for ISP-Bound Traffic, Order on Remand and Report and Order and Further Notice of Proposed Rulemaking, FCC 08-262, 24 FCC Rcd. 6475 at ¶ 6 (2008).

[69] *See Core Commc'ns, Inc. v. FCC*, 592 F.3d 139, 144 (D.C. Cir. 2010).

[70] *Id.*

[71] *See* Vonage Holdings Corp., Memorandum Opinion and Order, FCC 04-267, 19 FCC Rcd. 22404 at ¶ 6 (2004) (*Vonage Order*).

the service where the information resides.'"[72] The Commission has repeatedly found that the geographic location of the end user and the location of the "termination" point of a broadband communication are both "difficult or impossible to pinpoint" due to the inherent capability of IP-based services to enable users to "access different websites or IP addresses during the same communication session and to perform different types of communications simultaneously, none of which the provider has a means to separately track or record."[73]

The "total lack" of definable "points" is the primary distinction between packet-switched broadband transmissions and circuit-switched transmissions on the PSTN.[74] Rather than create dedicated communications paths, the internet uses "routing" to enable the transmission of information without specifying a particular path (i.e., circuit) or end point. All internet applications (e.g., email or web browsing) use internet protocol (i.e., the rules governing how internet messages are transmitted and received), which is designed to enable devices to connect *indirectly* — i.e., device "A" can send a message to device "B" without knowing where it is on the network. IP accomplishes this by dividing internet transmissions into discrete portions known as "packets" that are sent individually, thus eliminating the need for a dedicated circuit. Each packet contains addressing information in its "header." This information is used to route packets dynamically to one or more destinations using one or more paths. The process of transmitting an IP message from one network to another is called "forwarding," and the collective process of forwarding messages from one device to another is called "routing."

The internet protocol suite has a system for identifying and addressing devices on both (1) local networks and (2) between different networks. Each device on a local network has a *unique* number known as a "hardware address" (or "MAC address"), i.e., each MAC address refers to a spe-

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[72] *ISP Preemption Order* at ¶ 3 (*quoting Stevens Report* at ¶ 64).

[73] *Vonage Order* at ¶ 25.

[74] *See id.*

cific physical device on a local network (similar to the way in which each mobile phone is assigned a unique telephone number). MAC addresses are used for transmissions between hardware devices that are *directly* connected on a local network. Each device connected to the internet is also *associated* with (but not necessarily permanently assigned) an "IP address." IP addresses are *independent of particular hardware* (i.e., logical) and are used to create a "virtual network" for *indirect* transmissions between or among local networks (i.e., "internetworking").

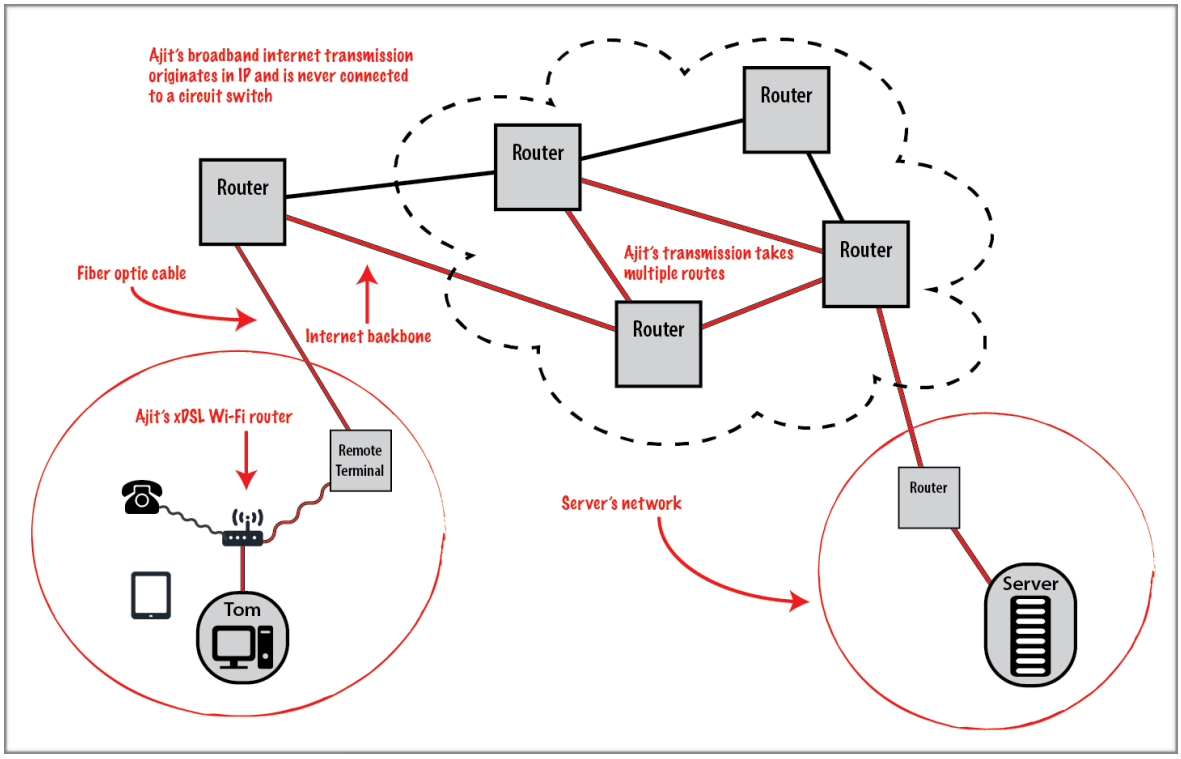
Unlike a 10-digit telephone number, which identifies a specific loop or mobile device, an IP address does not identify a specific device; an IP address identifies only the interface ("host" or "network interface") between a specific device and the internet (other networks). The main components of an IP address are a "Network Identifier" (or "Network ID"), which identifies the network where the host is located, and a "Host Identifier" (or "Host ID"), which identifies the host on the network. Each internet router maintains a "routing table" that maps different Network IDs and the other routers to which the router is connected. Each entry in the table contains information about one network (or subnetwork or host) indicating the routes that lead to that destination. Each time a router receives a packet, it compares the destination IP address to the entries in its routing table to decide where to send the packet next. The process of routing is what allows a device to send transmissions to any other device on the internet without specifying an endpoint or even knowing where the endpoint is.

The use of "logical" IP addresses solves the basic problem of connecting different networks: That actual transmissions between devices use MAC addresses, but each device on a local network only knows (or can directly discover using "address resolution protocol") the MAC addresses of the devices that are directly connected to that network.

For example, assume Ajit is using an xDSL broadband connection and wants to access information that is associated with the URL http://www.fcc.gov. As depicted in Figure 9, Ajit cannot directly connect to the server that has this information even if Ajit knows the server's MAC address,

because the server is on a different network, and neither Ajit nor his computer knows where the server's network is located. Ajit must instead send his message using the server's IP address, which enables routers to forward the message from one physical network to the next, one step (or "hop") at a time. At each hop, a router determines where to forward the message next until it reaches the host, which knows (or can discover) the server's MAC address and forward the message to its final destination. Note that, if a particular route becomes congested, Ajit's transmissions may take multiple paths, and there is no way for Ajit to specify or even know the points of his transmissions.

Figure 9. Internet Routing



Also note that Ajit's xDSL connection is "always on." Unlike the dial-up internet, no PSTN call is required to "access" the internet — Ajit's personal router and telephone line are a part of the internet itself (the phrase "broadband internet 'access' service" a misnomer). Indeed, Ajit's "telephone" line is no longer directly connected to the circuit switch in the central office. It is instead connected to an IP-based "digital subscriber line access multiplexer" ("IP-DSLAM") located in a

remote terminal in Ajit's neighborhood (usually in a green metal box), and the remote terminal (or "node" or "Serving Area Interface") is connected to the central office by a fiber optic connection. The IP-DSLAM converts analog voice transmissions to IP data and multiplexes the converted voice data with the IP data generated by Ajit's computing devices.

The World Wide Web

The "World Wide Web" (or "web") is arguably the most important internet application. The web's appeal is that it easily allows related documents and media to be "hyperlinked" together using "Hypertext Transfer Protocol" (or "HTTP"). HTTP is a server-client oriented application. Its primary function is to transfer files from web servers to user devices (or "clients"). In terms of actual communication, clients are primarily used to request information from web servers, which respond to those requests with the information sought by the user.

The earliest version of HTTP was very simple, but quickly overloaded the internet when its popularity exploded. Many of the features introduced in subsequent versions were designed to reduce the bandwidth consumed by repetitive HTTP requests and responses. These features include "proxying" and "caching."

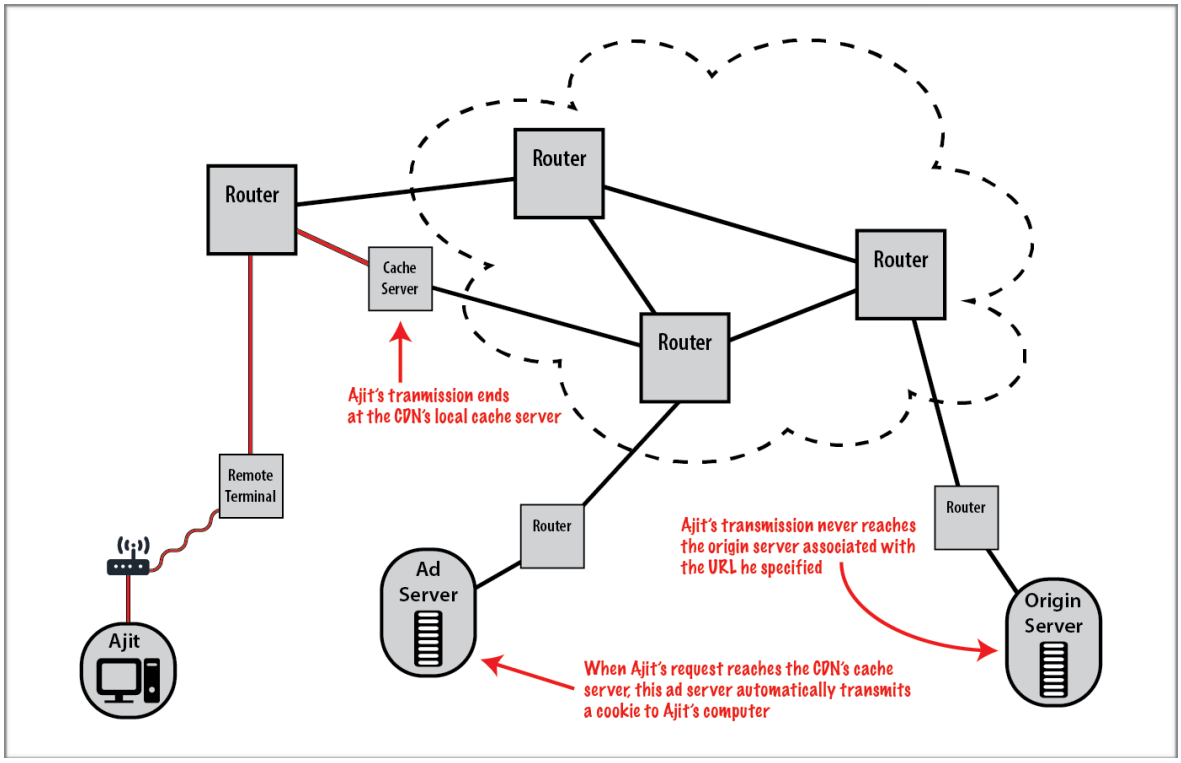
A "proxy server" (or "surrogate") is a server that acts as an intermediary for requests from clients seeking information from other servers.

A "cache" stores web information on a device that a client is likely to request repeatedly so that a web server does not need to resend the information whenever the client makes a new information request. A cache can be implemented on any device, including a client device (a personal computer's "web browser cache") or an intermediary device between a client and a web server ("intermediary" or "proxy" caching). If a user wants information that is not already in the client's cache, an intermediary cache server might be able to provide the information. This is not as efficient as retrieving the information from the client's local cache, but it is far more efficient than sending the request

to the actual origin server, and unlike the local client's cache, a cache server has the advantage of being available to multiple clients. Content delivery networks (or "CDNs") typically use cache servers extensively in the provision of their services.

A cache server on the web typically appears to clients (i.e., end user computers) as the origin server, which means that, though the client's user may not realize it, a client request for information from a particular URL (i.e., the end user's transmission) that is responded to by a cache server never actually reaches the origin server.

Figure 10. Internet Cache



For example, in Figure 10, when Ajit types a URL into his web browser and hits enter, the web page associated with that URL is served by a cache server administered by a content delivery network rather than the origin server where the information was originally uploaded. Moreover, when Ajit's request reaches the cache server, it may result in numerous additional transmissions from multiple additional servers. For example, any server to which a request is sent can transmit a

"cookie" to the client (the user's computer), and that server can also enable the transmission of "third party cookies" to that user's computer from multiple servers in multiple locations that are typically unknowable by the user, let alone "specified" by the user as "points" of transmission.

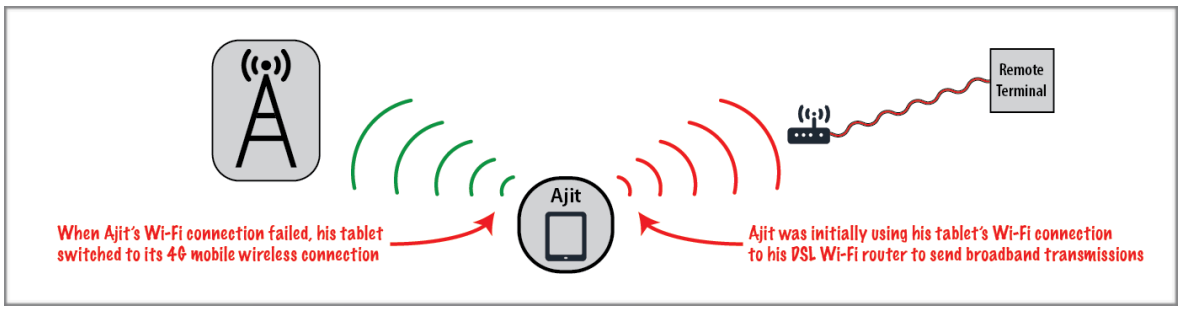
In short, it is literally *impossible* for a broadband user to specify the "points" of an internet "transmission" on the web as required by the definition of "telecommunications" in 47 U.S.C. § 153(50). When a user types a URL into a web browser, the user is not specifying the endpoint for a "transmission"; the user is specifying the original *source of the information* the user wants to retrieve. In stark contrast to a call on the PSTN, the endpoint of a user's URL-based broadband transmission is routinely different from its original source — and that fact is largely irrelevant to the user.

Figure 10's illustration of third party cookies also demonstrates the lack of user choice inherent in many broadband transmissions. Neither Ajit nor the owner of the web page Ajit visited "chose" to send the particular third party cookie to Ajit's computer in any direct sense (as is the case with a POTS call). The cookie was chosen by a third party ad network with whom the end user might have no relationship.

Devices with multiple connectivity

The simplified illustrations above indicate that the path of broadband transmissions in the "last mile" is static. In reality, however, the paths taken by a user's broadband transmissions are often dynamic at all points, because many devices today have more than one broadband connection to the internet. Smartphones and tablets often have both a Wi-Fi connection and a 3G or 4G broadband connection to a mobile service provider, and computers often have both those connections as well as a wired ethernet connection. Though users can specify which broadband connection they wish to use, most devices come with default preferences, and some devices automatically switch connections to optimize throughput. As a result, a user may not even be aware of the first point reached by the user's broadband transmissions, as illustrated in Figure 11.

Figure 11. Multihoming Example



Element 4: Without change in the form or content of the information as sent and received

On a plain old telephone call, the user's voice is transmitted without alteration of any kind. The familiarity of this simple fact underlies the common idiom that is often said upon beginning or ending a telephone conversation, "it's good to hear your voice."[75]

The form and content of internet transmissions, however, are routinely altered. As the Commission noted in the *Stevens Report*, web page transmissions change in form or content because, *inter alia*, "the appearance of the files on a recipient's screen depends in part on the software [or the type of device] that the recipient chooses to employ."[76]

The above analysis demonstrates that the definition of "telecommunications" clearly distinguishes between (1) plain old telephone service (i.e., circuit switched) transmissions that are interconnected with the public switched telephone network (PSTN), and (2) packet switched services that are *not* interconnected with (or used to manage) the PSTN (e.g., internet access services). Congress's intent is also clear: Transmissions that are interconnected with the PSTN are properly subject to Title II regulation, and non-interconnected transmissions, including broadband internet transmissions, are not.

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[75] *See* McGraw-Hill Dictionary of American Idioms and Phrasal Verbs (2002).

[76] *Stevens Report* at ¶ 76.

The *Title II Order's* "telecommunications" analysis ignores relevant facts and context

Title II Order's *analysis of "specified points"*

To bolster its absurd conclusion that users "specify" the "points" of internet transmissions merely because consumers can send and receive information they desire using the internet, the *Title II Order* pointed to several services that are treated as "telecommunications" even though users typically do not know the precise geographic location of the called party: cell phone service, toll free 800 service, and call bridging service.[77] None of the cited services support the notion that internet transmissions are "telecommunications," however, because theses services do not alter the fundamental character of the PSTN — i.e., they either have specifiable endpoints (irrespective of their geographical location) or fall within the "telecommunications management exception."

As noted above, cellular calls, like all other POTS calls placed on the PSTN, specify a particular endpoint by virtue of the fact that the last four digits of a telephone number refer to a specific mobile device or line (i.e., endpoint). Like adjunct-to-basic services, the end result of a mobile call is that a customer "get[s] ordinary, basic telephone service."[78] The closest internet analogy is the MAC address, which cannot be specified by a user sending a transmission on the internet. Internet users must instead use intermediate IP addresses.

It is also noteworthy that Congress expressly provided that interconnected mobile services be treated as common carriage, presumably because all transmissions that are interconnected with the PSTN are "telecommunications."[79] Indeed, when the Commission established the cellular communications service in the early 1980s, it classified cellular service as a common carrier service based on its ubiquitous interconnection with the PSTN. Specifically, the Commission imposed common carrier obligations on cellular services because they could provide "users with intercon-

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[77] *Title II Order* at ¶ 361.

[78] *Centrex Order* at ¶ 27.

[79] *See* 47 U.S.C. § 332(c)(1).

nected service over the public telephone network," which made cellular service "an important adjunct to, and extension of, the public switched network."[80] Cellular carriers were thus deemed to be "engaged in the provision of local exchange telecommunications in conjunction with the local telephone companies and are therefore 'co-carriers' with the telephone companies."[81]

The *Title II Order's* reference to 800 service ignores both the relevant facts and Commission precedent. First, 800 service can be and was historically provided without using the database lookup functionality that is typically used today. From 1967 until 1981, 800 service calls used telephone numbers in which the last four digits specifically "identified the customer, *the end office serving the customer* [i.e., the terminating office, a known "point"], and the service areas to which the customer had subscribed."[82] Second, the shift from encoded 800 numbers to the use of databases for 800 calls did not alter the regulatory status of 800 service because such databases are used only for call rerouting, which has traditionally fallen into the "adjunct-to-basic" category,[83] and thus, now falls within the "telecommunications management exception."[84]

Call-bridging service, which is essentially a form of expanded 3-way calling, is likewise a traditional "adjunct-to-basic" service that now falls within the "telecommunications management exception." The Commission has concluded that the "purpose and function of the bridge is simply to

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[80] *See* Inquiry into the Use of the Bands 825-845 MHz & 870-890 MHz for Cellular Commc'ns Systems, Report and Order, FCC 81-161, 86 F.C.C.2d 469 at ¶¶ 34, 54 (1981).

[81] *See* The Need to Promote Competition & Efficient Use of Spectrum for Radio Common Carrier Servs., Memorandum Opinion and Order, FCC 86-85, 59 Rad. Reg. 2d (P & F) 1275 at ¶ 12 (1986). The Commission determined that cellular carriers were not "interexchange carriers" subject to the imposition of access charges for exchange access and were also not "end users" subject to subscriber line charges, because the Commission had consistently treated mobile radio services as local in nature. *See* MTS and WATS Market Structure, Memorandum Opinion and Order, FCC 84-36, 97 F.C.C.2d 834 at ¶¶ 144-50 (1984).

[82] *See United States v. Am. Tel. & Tel. Co.*, 604 F. Supp. 316, 319 (D.D.C. 1985). "Because all of the digits in 800 numbers had significance for screening and routing 800 Service calls, subscribers had no choice of 800 Service numbers, and they were required to change their 800 numbers if they changed their receiving location or required different geographic coverage." *Id.*

[83] *See Centrex Order* at ¶ 27.

[84] *See Non-Accounting Safeguards Order* at ¶¶ 106-107.

facilitate the routing of ordinary telephone calls"[85] and that other features offered with call-bridging services "do not alter the fundamental character" of the basic service.[86] Finally, the Commission has indicated that, like a dial-up internet servicer provider's server, the conference bridge itself is the "point specified by the user" when dialing into a conference call.[87]

Title II Order's *analysis of "without change in form or content"*

The *Title II Order's* finding that the internet transmits information without change in form or content likewise ignores the established context in which the 1996 Act's definitions were adopted. The *Title II Order* erred in treating the protocol processing performed by broadband ISPs as irrelevant because it is "for the management of the broadband Internet access service,"[88] i.e., because it falls under the "telecommunications management exception." The *Title II Order's* finding that implementation of the Domain Name System (DNS) "fit[s] squarely within the telecommunications systems management exception to the definition of 'information service'" is similarly in error.[89] When it is applied this narrowly, the telecommunications management *exception* swallows the rule — the entire broadband internet access service falls within the management exception. The Commission has always recognized that the services that were included in the exception's predecessor, the "adjunct-to-basic" category, would otherwise be "enhanced services." They were nevertheless *treated* as basic services (i.e., "telecommunications") because they were necessary to facilitate the use of a *different* (i.e., basic) service.[90] Broadband ISPs' use of DNS and routing of packets within their net-

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[85] *See* Request for Review by Intercall, Inc. of Decision of Universal Serv. Adm'r, FCC 08-160, 23 F.C.C. Rcd. 10731, 10735 at ¶ 11. (2008).

[86] *See id.* at ¶ 13.

[87] *See id.* at ¶ 11.

[88] *See Title II Order* at ¶ 362.

[89] *See Title II Order* at ¶ 356.

[90] *See* Petition for Declaratory Ruling, 19 FCC Rcd. 3307, 3314–15 at ¶ 13 (2004).

work is not intended to facilitate a separate service; it's an inherent part of the internet access service itself.[91]

The *Title II Order's* interpretation of this element (no change in form or content) is also too narrow when considered in the context in which the 1996 Act's definitions were adopted. Even if it were true, as the *Title II Order* claims, that "[b]roadband providers thus move packets from sender to recipient without any change in format or content" of the packets by the broadband provider,[92] the *output* of internet transmissions *does* change in form and content. And, with respect to this element of "telecommunications," the regulatory focus has always been on the ultimate output of the information, not on the technical details of its transmission.[93] In its 1983 *Protocol Processing Order*, for example, the Commission stated that a basic network "produces at the *output(s)* unchanged information received at the input."[94] The Commission focused on the output of the information transmitted because it captures a fundamental distinction between POTS and "enhanced" or "information" services: On a plain old telephone call, and end user hears the voice and words of a caller exactly as the caller spoke them; but with with respect to enhanced/information services, the output is variable.

Title II Order's *interpretation of "telecommunications" contradicts the structure of the Act*

The *Title II Order's* sweeping definitions of "telecommunications" and "telecommunications service" also contradict the Act's structure. As Judge Brown noted in his dissent to the D.C. Circuit's *en banc* decision, the 1996 Act is deregulatory in structure and even goes so far as to include language specifically excluding "telecommunications services" from the definition of "Internet access

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[91] This offers a potential explanation for the *Title II Order's* use of the phrase "domain name 'service'" rather than the ordinary usage of "domain name 'system.'"

[92] *See Title II Order* at ¶ 362.

[93] *See, e.g., Stevens Report* at ¶ 77 (focusing on the way a web page is displayed to the end user).

[94] Commc'ns Protocols Under Section 64.702 of the Commission's Rules & Regulations, 95 F.C.C.2d 584, 589 at ¶ 11 (1983) (*Protocol Processing Order*).

service."[95] Yet, if the *Chevron* analysis in the *Open Internet Order* stands, the Commission would have authority to do everything from (1) regulating broadband networks from end-to-end as if they were wholly equivalent to the traditional public switched telephone network to (2) not regulating broadband networks at all. For Congress to grant an agency such open-ended power over a "policy decision of such economic and political magnitude" defies "common sense."[96] "Congress ... does not alter the fundamental details of a regulatory scheme in vague terms or ancillary provisions—it does not, one might say, hide elephants in mouseholes."[97]

The *Title II Order* tries to hide a lot of elephants in mouseholes. Consider its decision to equate IP addresses with NANP telephone numbers by concluding that the "public switched [telephone] network" includes authority over "public IP addresses."[98] The Commission has long asserted plenary jurisdiction over telephone numbers under Section 201(a) of the Communications Act, because "telephone numbers are an indispensable part" of the duties that section imposes on carriers.[99] In the 1996 Act, Congress imposed specific duties on the Commission's exercise of its plenary authority over telephone numbers in 47 U.S.C. § 251(e), which provides, among other things, that "the Commission shall create or designate one or more impartial entities to administer *telecommunications numbering* and to make such numbers available on an equitable basis." Yet, at the same time the Commission was deciding that DNS is a form of telecommunications numbering, the National Telecommunications and Information Administration was preparing to transfer control over DNS

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[95] *See Judge Brown Opinion* at 394-95.

[96] *See Food & Drug Admin. v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 132–33, 120 S. Ct. 1291, 1300–01, 146 L. Ed. 2d 121 (U.S. 2000).

[97] *Whitman v. Am. Trucking Associations*, 531 U.S. 457, 468, 121 S. Ct. 903, 909–10, 149 L. Ed. 2d 1 (2001).

[98] *Title II Order* at ¶ 391.

[99] *See* Administration of the North American Numbering Plan, Notice of Proposed Rulemaking, FCC 94-79, 9 FCC Rcd. 2068 at ¶ 8 (1994).

to the "global multistakeholder community."[100] How could the NTIA transfer authority over something that Congress expressly delegated to the Commission? Former FCC Chairman Wheeler told the Senate that the Commission had forborne from enforcing § 251(e),[101] but the *Title II Order* never mentions § 251(e), not even once.[102] It appears the *Title II Order* didn't mention this provision because everyone — Congress, multiple Presidents, NTIA, the FCC, and the public — had always assumed that NTIA had full authority over DNS (because internet access is not "telecommunications"), and the Commission did not want to draw attention to this fact.

Broadband internet access service as an information service

Though it is unambiguous that internet transmissions are not "telecommunications" within the meaning of 47 U.S.C. § 153(50), it is less clear that broadband internet access service is an "information service" within the meaning of 47 U.S.C. § 153(24). The Act defines an "information service as "the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information *via* telecommunications ...."[103] The use of the phrase "via telecommunications" could be interpreted to mean that Congress intended to limit its definitional scheme to the operation of dial-up internet access and other services that are initiated by an ordinary telephone call, which would make broadband internet access an undefined service subject only to the Commission's Title I jurisdiction (just like cable services were before Congress added a definition for "cable service" to the Act). Alternatively, the phrase "via telecommunications"

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[100] *See* NTIA Announces Intent to Transition Key Internet Domain Name Functions, Press Release (March 14, 2014), available at https://www.ntia.doc.gov/press-release/2014/ntia-announces-intent-transition-key-internet-domain-name-functions.

[101] *See* Responses of FCC Chairman Tom Wheeler to Senators Questions, available at http://tinyurl.com/y9fsllgh.

[102] *See* Fred Campbell, *FCC response to Sen. Cruz reveals hidden ICANN agenda in net neutrality order*, THE HILL (Apr. 18, 2016), available at http://tinyurl.com/y8llp758.

[103] 47 U.S.C. § 153(24) (emphasis added).

could be interpreted to be a simple acknowledgement that the facilities used to provide information services could be (and often are) used for "telecommunications" transmissions as well.[104]

It is *clear*, however, that even if broadband internet transmissions were treated as "telecommunications," BIAS would be an "information service" within the meaning of 47 U.S.C. § 153(24). As noted in the discussion above, broadband users lack the ability to specify points of transmission due to the internet's inherent design. It is therefore axiomatic that broadband ISPs are not "offering" that capability to end users — if ISPs actually represented that they were offering such a capability to consumers, they would be guilty of false advertising. It is thus unambiguous that BIAS providers are offering an *integrated* "information service" even if internet transmissions were treated as "telecommunications." In other words, when the underlying facts are rigorously applied to the definition of "telecommunications," there is no ambiguity in the word "offering" as used in the definition of "telecommunications service," at least when it is applied to broadband internet access service. BIAS providers simply *cannot* honestly include "telecommunications" in their BIAS "offer."

The Supreme Court's holding in *Brand X* presents no barrier to the Commission reaching this conclusion.[105] First, the Court did not have an occasion to fully consider the implications of the definition of "telecommunications" or its application to the facts regarding broadband internet access service because the parties *conceded* that the cable broadband service used "telecommunications" to provide internet access.[106] Second, *Brand X* itself held that "judicial interpretation contained in precedents [are held] to the same demanding *Chevron* step one standard that applies if the court is reviewing the agency's construction on a blank slate: Only a judicial precedent holding that the statute unambiguously forecloses the agency's interpretation, and therefore contains no gap for the

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[104] The Commission has in the past required facilities owners to lease or "unbundle" their facilities in a manner that provides the lessee a "a pure transmission capability over a communications path that is virtually transparent in terms of its interaction with customer supplied information." *See Computer II* at ¶ 96.

[105] *Nat'l Cable & Telecommunications Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 125 S. Ct. 2688, 162 L. Ed. 2d 820 (2005) (*Brand X*).

[106] *See id.*, 545 U.S. at 988, 125 S. Ct. at 2703.

agency to fill, displaces a conflicting agency construction."[107] This principle is equally applicable to a judicial precedent indicating that statutory language is ambiguous when the precedent is premised on concessions by the parties that are critical to the case. In these circumstances, the *Brand X* Court cannot be said to have foreclosed a Commission interpretation that the term "offering" is unambiguous when read in context with the term "telecommunications" and its application to facts regarding the network topologies of the PSTN and the internet, a task the Court did not perform and that naturally falls within the Commission's area of expertise.

The *Title II Order* violates the First Amendment

Finally, even if BIAS were properly considered a "telecommunications service," mandating that it be regulated as common carriage under *Title II* violates the First Amendment. Rather than restate the argument here, the author is attaching to these comments, and incorporating by reference herein, his article entitled, *The First Amendment and the Internet: The Press Clause Protects the Internet Transmission of Mass Media Content from Common Carrier Regulation*.[108]

Respectfully submitted,

TECH KNOWLEDGE

By: /s/ FBCJR

Fred B. Campbell, Jr.
Director
14925 Doe Ridge Road
Haymarket, VA 20169
703-470-4145

[107] *See id.*, 545 U.S. at 982-83, 125 S. Ct. at 2700.

[108] Submitted with permission from the NEBRASKA LAW REVIEW. This article was previously published in the NEBRASKA LAW REVIEW. *See* Fred B. Campbell, Jr., *The First Amendment and the Internet: The Press Clause Protects the Internet Transmission of Mass Media Content from Common Carrier Regulation*, 94 NEB. L. REV. 559 (2016).